Pretreatment and fermentation strategies to overcome the toxicity of acetic acid in hemicellulosic hydrolysates

Mussatto, Solange I.

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Tuesday, May 02, 2017
6:00 PM - 8:00 PM
San Francisco Marriott Marquis - Yerba Buena Salons 9, B2 Lower Level

Acetic acid is one of the most important toxic compounds present in hemicellulosic hydrolysates. In order to overcome this problem, several strategies were studied for both biomass pretreatment and fermentation steps. Biomass deacetylation by mild alkaline pretreatment or using high pressure CO2 were considered interesting strategies to selectively remove acetic acid from biomass structure. In addition, the selective removal of acetic acid from biomass as a first step in the whole biomass conversion chain, contribute for the development and implementation of competitive biorefinery platforms where acetic acid can also be integrated as a valuable final product. For the fermentation step, it is well known that hemicellulosic hydrolysates usually need to be detoxified prior use as fermentation medium in order to improve the performance of the microorganism to convert sugars in the product of interest. Although detoxification improves the fermentability of hydrolysates, this additional step adds cost and complexity to the process and generates extra waste products. In this sense, the adaptation of the fermenting microorganism to increased concentrations of acetic acid can be considered as a promising alternative to improve the microbial strain performance avoiding these problems. Evolutionary engineering strategy based on mutagenesis by UV irradiation and subsequent selection by continuous cultivation at increased concentrations of acetic acid is an example of strategy that was successfully used to develop an evolved yeast strain with improved resistance to acetic acid.

Author

Solange I. Mussatto
Technical University of Denmark

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To whom it may concern:

The Society for Industrial Microbiology hereby certifies that Solange I. Mussatto has attended the 39th Symposium on Biotechnology for Fuels and Chemicals (Monday, May 1 – Thursday, May 4 2016, in San Francisco, California), and presented the following abstract:

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Sincerely,

Christine Lowe

Christine Lowe
Conference Coordinator

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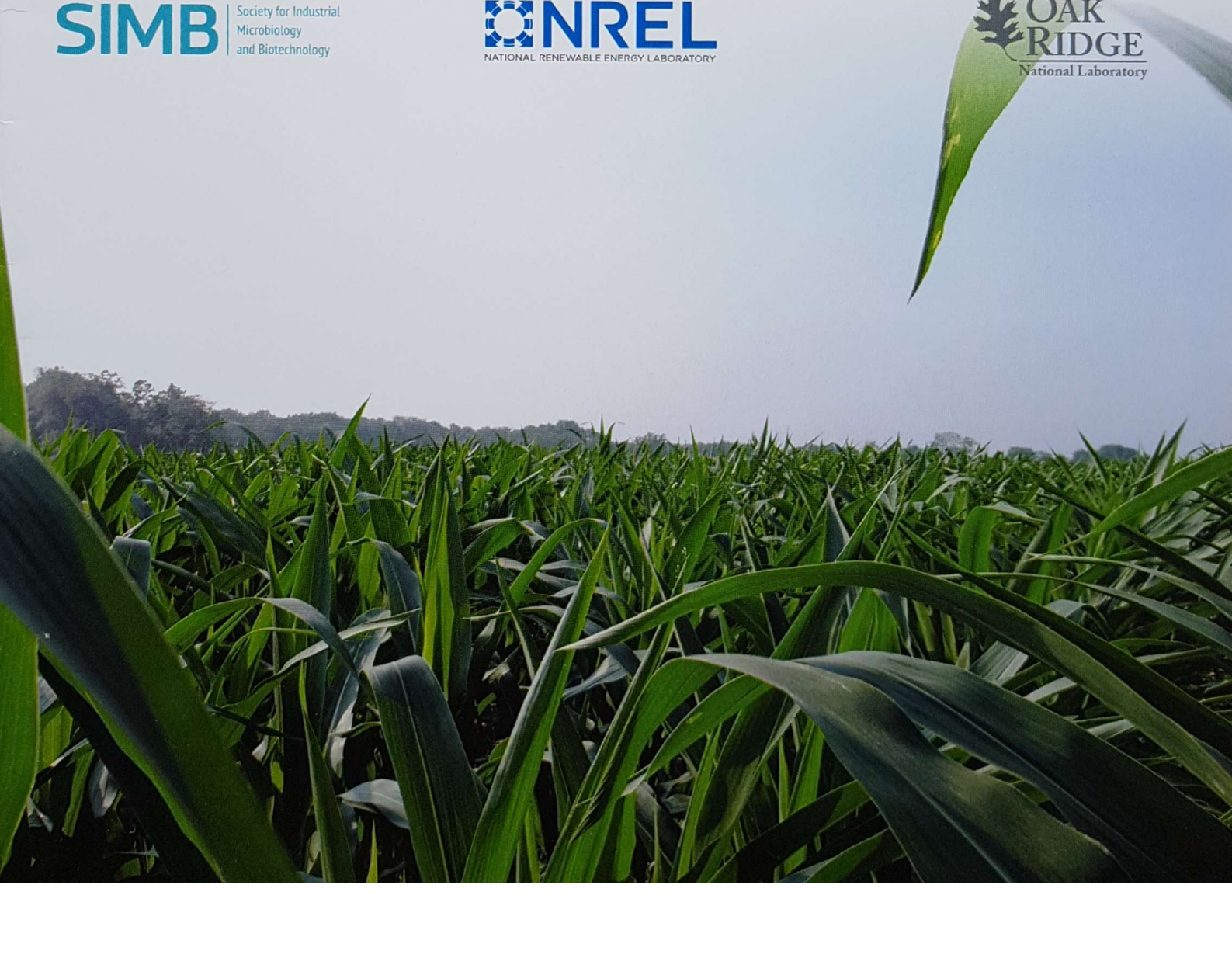

T97 **Lactic acid purification process using molecular distillation on a fermented molasses broth**
R.A. Oliveira, State University of Campinas, Campinas, SP, Brazil, Brazil, A. Komesu, University of Campinas, Campinas, Brazil, C.E. Vaz Rossell, Centro Nacional de Pesquisa em Energia e Materiais (CNPEM), Campinas, Brazil, R.M. Filho*, School of Chemical Engineering, State University of Campinas, Campinas, Brazil and M.R. Wolf Maciel, State University of Campinas - UNICAMP, Campinas, Brazil

T98 **Integrated 1st and 2nd generation bioethanol production with maintained DDGS quality**
M. Persson*, B. Erdei, M. Galbe, K. Kovacs and O. Wallberg, Lund University, Lund, Sweden

T99 **Economic evaluation of an industrial enzyme production process using recombinant *E. coli***
R. da Gama Ferreira* and A. Rodrigues Azzoni, University of Sao Paulo, Sao Paulo, Brazil; S. Freitas, University of Campinas, Campinas, Brazil

T100 **Biosurfactant production in aerobic and anaerobic conditions by different microorganism using PAHs as carbon source**
M. Diaz de Rienzo*, University of Manchester, Manchester, United Kingdom and P. Martin, The University of Manchester, Manchester, United Kingdom

T101 **Evaluation of an integrated biorefinery processing energy cane and sweet sorghum for the production of electricity, ethanol and butanol**
D. Aragon*, Louisiana State University, St. Gabriel, LA, USA

T102 **Ester production from carboxylates obtained by anaerobic waste treatment**
C.I. Cabrera-Rodríguez, L.A.M. van der Wielen and A.J.J. Straathof*, Delft University of Technology, Delft, Netherlands

T103 **Industrial technologies for lignocellulosic biobutanol production from hemicellulose hydrolysate**
L. Wang*, F. Kong and H. Chen, State Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Science, Beijing, China

T104 **Optimization of sugarcane biomass utilization for ethanol and electricity production: Development of an integrated methodology for sustainability assessment**
V.C. Geraldo, B. Klein, T.L. Junqueira, M.F. Chagas, C.D.F. Jesus, E.R. Morais* and A. Bonomi, Laboratório Nacional de Ciência e Tecnologia do Bioetanol (CTBE), Campinas, Brazil; R. Maciel Filho, University of Campinas, Campinas, Brazil

T105 **Assessing cyanobacterial polysaccharides as a production platform for renewable fuels, chemicals, and biomaterials**
E. Sundstrom*, M. Mirsiaghi, R. Doolittle, T. Pray and D. Tanjore, Lawrence Berkeley National Laboratory, Berkeley, CA, USA; R. Mancinelli and D. Smernoff, Heliobiosys Inc, Woodside, CA, USA

T106 **Production of biojet fuel in microplant by the transformation of palm oil through hydrodeoxygenation, isomerization, and hydrocracking reactions**
J.A. Aburto-Anell and L.F. Ramírez-Verduzco*, Instituto Mexicano del Petróleo, Mexico, Mexico

T107 **Impact of heat integration in a biorefinery producing ethanol, electricity and furfural from sugarcane**
J.F. Leal Silva* and R. Maciel Filho, University of Campinas, Campinas, Brazil; T.L. Junqueira, B.C. Klein and A. Bonomi, Brazilian Bioethanol Science and Technology Laboratory, Campinas, Brazil; S. Vaz Jr., Embrapa Agroenergy, Brasília, Brazil

T108 **Pretreatment and fermentation strategies to overcome the toxicity of acetic acid in hemicellulosic hydrolysates**
S.I. Mussatto*, Technical University of Denmark, Kongens Lyngby, Denmark

T109 **Dynamic simulation and techno-economic assessment of (acetone)-isopropanol-ethanol-butanol fermentation coupled to in situ product recovery techniques**
E. Toth*, H. Gonzalez Peñas, V. Coupard and D.M. Silva-Felgueira, IFPEN, Solaize, France

T110 **Oxygen transfer in sesquiterpene fermentations**
S. Pedraza-de la Cuesta*, C. van Houten, L.A.M. van der Wielen and M.C. Cuellar, Delft University of Technology, Delft, Netherlands; F. Feskens-Snoeck, Delft Advanced Biorenewables, Delft, Netherlands